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COMPLETE SPECIFICATION.

Improvements in the Manufacture or Treatment of Beer or other Fermented Liquors or Beverages.

A communication from abroad by CASPER PFAUDLER, of Rochester, Monroe County, State of New York, United States of America, Citizen of the United States.

I, WILLIAM PHILLIPS THOMPSON, F.C.S. M.I.M.E., of the Agency for Foreign Patent Solicitors, 6, Lord Street, Liverpool, and 6 Bank Street, Manchester, both in the County of Lancaster, and 323, High Holborn, in the County of Middlesex, Civil Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to those fermented beverages which, after the main fermentation is completed, are subjected to prolonged, slow secondary fermentation at low temperature to give them certain essential qualities known as "ageing" or "ripening" but this term "ageing" is not to be confounded with the term as applied to distilled liquors where no fermentation ensues after the main fermentation, the purpose and the results being widely different. A temperature of 30 to 50 degrees Fahrenheit is recommended in the storage and finishing cellars or about the ordinary temperatures.

The beverages subjected to this secondary fermentation arevarious beers, notably the United States lager beer, varieties of ale and wine *etcetera*, and heretofore for best results, it has continued for many months or sometimes years. All fermented beverages (not distilled liquors), after the main fermentation are crude, and turbid, and for immediate consumption, have been simply clarified, but for superior beverages, an extended treatment is required to age or ripen them, requiring large storage capacity.

The invention seeks to produce this superior beverage with its ripened qualities in a much shorter time.

[*Price* 8*d*.]

To this end, after the main fermentation, the beverage is enclosed in a close vessel in a cool atmosphere ; the atmospheric air is abstracted and a partial vacuum maintained by an exhaust pump, while the secondary fermentation progresses, and until the beverage has the required characters.

The invention will be described in connection with making United States lager beer ; after the main fermentation the beverage is transferred to storage casks in cold cellars. The casks are closed to exclude air, and a partial vacuum is maintained with the pump, which pumps out the carbonic acid gas as rapidly as generated. This greatly accelerates the action of the secondary fermentation and the "aged" or "ripened" condition is attained in a remarkably short time. No shavings are required, and this is one of the valuable objects and results of the invention. In ten to fourteen days a ripened quality not attainable heretofore in less than three or four months has been produced.

The invention has relation solely to the treatment in the secondary fermentation, of beverages which, after the main fermentation, are subjected to this secondary fermentation, to age or ripen them, and consists in maintaining a partial vacuum throughout this secondary fermentation, which procedure, is believed to be new.

The invention may also be applied to ruh beer in the finishing stage after leaving the ruh casks. To this end kraeusen may be added and preferably finings, and either with or without shavings, and a partial vacuum be then maintained as above described.

Under this treatment the beer becomes fine and bright in a greatly reduced time, and when it has reached the desired condition, a bunging apparatus may be applied in the usual way. The exhausting process may thus be applied with advantage to either of the two stages above designated, but it is preferable to apply it to both.

In the drawings, illustrating apparatus for the manufacture of beer, A A^1 designate storage vats or casks and the finishing casks. Among these conveniently located to each other A may be the ruh or storage casks, and A^1 the finishing or shavings casks. These vessels are wholly closed, except that each connects by a pipe *a* or a^1 with a pipe *b* or b^1, and the pipes *b* b^1 connect by a pipe *c* with a closed tank B, which connects by a pipe *b* with an air pump C. The discharge pipe *e* of the air pump leads into a storage vessel D. All are provided with suitable stop-cocks. The vessels A or A^1, as the case may be, having been filled with beer in the proper condition, as hereinbefore defined, preferably nearly to their tops, the stop-cocks are opened to establish communication between the upper parts of the vessels and the tank B. The air pump rarifies the air in the tank and in the vessels, and the carbonic acid gas which rises in the fermenting vessels is drawn into the vacuum tank B. and thence sucked out and driven into the storage vessel D. In this way the carbonic acid gas may be saved for use in the arts if desired. Where the casks will endure the strain, it is preferable to exhaust to a pressure equal to twenty inches and upward of mercury, since the saving of time is in a great measure proportionate to the degree of vacuity maintained, and the quality of the product is also largely dependent on the same thing ; but more or less of the benefits of the process are obtained with almost any degree of rarefaction. The tank B causes an equality and uniformity of pressure in all the vessels.

The benefits derived from the use of this process are almost beyond estimate. Not only is the time consumed in manufacturing reduced to a degree that was never before deemed possible but a better quality of beer is produced than when made by the old method. Moreover, great benefits accrue to the beer by reason of the exclusion of the foul atmosphere of the cellars or vaults, the tendency of which is always to contaminate it more or less and produce deterioration of the beverage.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, as communicated to me by my foreign correspondent, I declare that what I claim is :—

1. In the manufacture of fermented beverages of the kinds which are subjected to a prolonged secondary fermentation, for the purpose of ageing or ripening them, the process of accelerating such ripening or ageing, which consists in enclosing the

beverage, after it has undergone the main fermentation, in a vessel surrounded by a cool atmosphere, and abstracting the atmospheric air and gaseous products of fermentation as they accumulate in the upper part of the vessel, until the beverage attains the desired condition, substantially as described.

2. In the manufacture of beer by bottom or lower fermentation, the process of accelerating the ripening of the beverage after it has passed through the main fermentation, which consists in enclosing it in a storage vessel, and maintaining in the vessel a rarified atmosphere, and abstracting the gaseous products of fermentation as they accumulate, substantially as described.

3. In the manufacture of beer, the process of accelerating the finishing and clarifying of the beverage after it has passed through the ageing or ripening process in the storage casks, which consists in enclosing it in a vessel, exciting in it a new fermentation, maintaining in the vessel a rarified atmosphere, and abstracting the accumulating gaseous products of fermentation, substantially as described.

4. The process of making beer which consists in first, fermenting the wort, then enclosing the beverage in vessels and maintaining in the said vessels a rarified atmosphere, thereby accelerating the after fermentation and ageing, then transferring the beverage from the last named vessels to the finishing casks, and maintaining it therein under a rarified atmosphere, and finally bunging the casks to saturate the beverage with the requisite quantity of carbonic acid gas, substantially as described.

Dated this 9th day of July 1888.

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Agents for the Applicant.

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